U. S. FOREST SERVICE

RESEARCH NOTE NC-29

NORTH CENTRAL FOREST EXPERIMENT STATION, FOREST SERVICE—U.S. DEPARTMENT OF AGRICULTURE

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Waterline Erosion Control Essential To Streambank Rehabilitation

ABSTRACT. — Tests of streambank erosion control measures on three Michigan streams have shown the key role of waterline stabilization. After undercutting was stopped, the upper banks were revegetated in 1 to 5 years depending on treatment. Without waterline control, all revegetation efforts were ineffective.

Eroding streambanks, which are the obvious source of much of the sediment in Michigan trout streams, have been stabilized by various methods—some expensive, some more economical. Recent tests of cheaper methods have shown that without waterline stabilization, usually by rock rip-rapping, upper bank control methods are of limited value.

These tests of rock rip-rap and various techniques of vegetation establishment were made at three locations in Lower Michigan: the North Branch of the Tobacco River in Clare County, Hersey Creek in Osceola County, and the Pere Marquette River in Newaygo County. The study was done by the North Central Forest Experiment Station in cooperation with the Michigan Department of Conservation, Fish Division, and the Huron-Manistee National Forests.

Rock rip-rap was applied to a bank on the Pere Marquette and to selected banks on the Tobacco River. The remainder of the banks on the Tobacco River and on Hersey Creek had no rock rip-rap. The Tobacco River channel was fenced to exclude cattle from the banks. Fencing was not necessary on the other areas.

All banks were graded before treatment. Some banks were seeded with a mixture of creeping red fescue, perennial rye, and blue grass, and top-dressed with approximately 2 tons per acre of slow-release 16-16-16 fertilizer. The test banks were divided into 10- to 20-foot-wide strips; each strip was sprayed with one of six different asphalt and latex base liquid mulches (fig. 1). The tests on

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Figure 1.—Liquid mulch being sprayed on a bank above rock rip-rap.

Hersey Creek and the Pere Marquette River also included limited comparisons with straw and fibre-net mulches.

All rip-rapped banks were almost completely vegetated within 3 years following treatment and were judged to be stabilized. On the other hand, several of the banks on the Tobacco River and the bank on Hersey Creek that had no rock rip-rap failed soon after the banks were graded and seeded, and have been eroding ever since.

Seeding and fertilizing accelerated revegetation of the banks (fig. 2), but after 2 years vegetation on unseeded rip-rapped banks had nearly caught up with that on seeded, rip-rapped banks. This was possibly due to introduction of seed with rock rip-rap which was obtained from field stone piles.

Mulching had no detectable effect on vegetation establishment.

Consistently, the best results were obtained by placing rock rip-rap along the waterline and sloping the upper bank. Seeding and fertilizing the upper bank aided in quick establishment of vegetation.

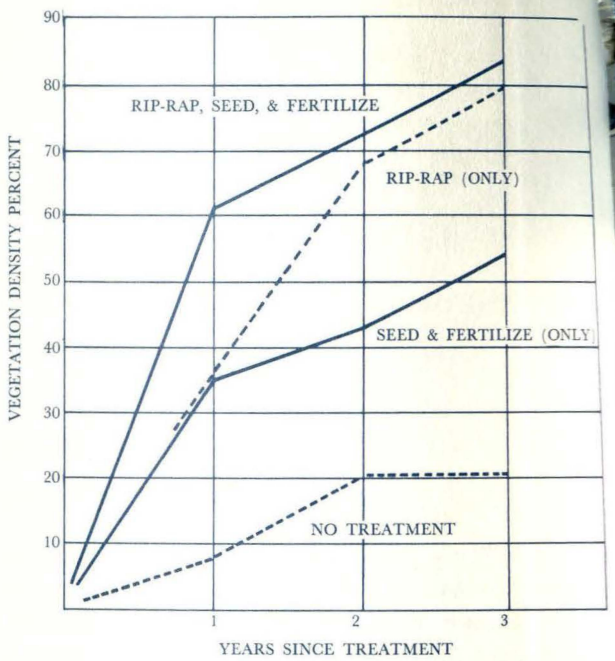

Figure 2.—Effect of bank treatment and time on vegetation density.

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